



PIER Energy System Integration Program Area

Demonstration and Evaluation of Emerging Distributed Energy Technologies

Contract #: 100-98-001 **Project #:** 35

Contractor: Electric Power Research Institute (EPRI)

Subcontractors: San Diego Gas and Electric Company; VFL Technologies, Inc.

Project Amount: \$15,000

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Status: Completed

Project Description:

The purpose of this project is to obtain information on the performance and operational aspects of technologies targeted for distributed energy resources (DER) applications.

DER refers to the concept of deploying small power generation systems throughout electric distribution and transmission systems. DER technologies, including small generators and energy storage devices located near customer loads, offer considerable promise for California's electric power system. For example, DER could help reduce demand on the state's power grid, improve power quality and reliability, and increase the use of environmentally clean energy.

DER technologies are still relatively new and very little real-world information is available regarding DER-related cost, performance, maintenance and interface issues. To help fill the information gaps, the project team collaborated with six companies including the host, San Diego Gas and Electric (SDG&E), to install, interconnect, and test the DER systems at their facilities to monitor and evaluate performance and cost.

This project supports the PIER Program objectives of:

- Improving the reliability/quality of California's electricity by providing information to support deployment of distributed energy resources to provide peaking power, enhance system reliability, and assure power quality.
- Improving the energy cost/value of California's electricity by assisting in the development/deployment of innovative distributed resource technologies that can potentially provide lower delivered cost electricity than central station power.
- Improving the environmental and public health costs/risks of California's electricity by providing information to support the development and implementation of environmentally preferred distributed generation.

Proposed Outcomes:

1. Obtain first-hand information on the performance and economic aspects of technologies targeted for DER applications.
2. Demonstrate and report on the field operation of a utility distribution system support DER system.
3. Report the performance, cost, and permitting issues of installing DER systems located at end-user facilities and connected in parallel to the utility electric distribution system.
4. Help utilities and end-user hosts gain a better understanding of potential impacts on their electric distribution systems as well as information on performance, emissions, economics, and institutional issues of DER systems, which were unclear at the start of this program.

Actual Outcomes:

This project conducted a field demonstration of DER systems at end-user host sites and a mobile interconnection trailer with a solid-state controller and protection device for utility distribution system support. The project team evaluated two different types of microturbine systems, an advanced internal combustion engine, and a flywheel energy storage system in the end-user demonstration. This program's focus was to gain first-hand experience with the intricacies of integrating DER systems with end-user facilities at the electric bus panel and parallel to the electric distribution circuit.

Project results are presented in an EPRI report, *Demonstration and Evaluation of Emerging Distributed Energy Technologies* (1007043) published in July 2002. The report describes performance, costs, and institutional issues related to deploying DER systems at end-user sites. Although the results highlight the demonstration of DER systems in San Diego, they are applicable to similar installations throughout the United States.

Project Status:

The project has been completed.